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Julian Chaidez, Jordan Cotler and Shawn Cui*, Department of Mathematics, Office 646, 150 N. University Street, West Lafayette, IN 47907. *Trisection invariants of 4-manifolds from Hopf algebras.*

The Kuperberg invariant is a topological invariant of closed 3-manifolds based on finite-dimensional Hopf algebras. Here we initiate the program of constructing 4-manifold invariants in the spirit of Kuperberg's 3-manifold invariant. We utilize a structure called a Hopf triplet, which consists of three Hopf algebras and a bilinear form on each pair subject to certain compatibility conditions. In our construction, we present 4-manifolds by their trisection diagrams, a four-dimensional analog of Heegaard diagrams. The main result is that every Hopf triplet yields a diffeomorphism invariant of closed 4-manifolds. In special cases, our invariant reduces to Crane-Yetter invariants and generalized dichromatic invariants, and conjecturally Kashaev's invariant. As a starting point, we assume that the Hopf algebras involved in the Hopf triplets are semisimple. We speculate that relaxing semisimplicity will lead to even richer invariants. (Received September 12, 2020)